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Sethu K. Madhavan et al.

METHOD AND SYSTEM FOR COMMUNICATING DATA OVER A WIRELESS COMMUNICATION SYSTEM VOICE CHANNEL UTILIZING FRAME GAPS

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APPEAL BRIEF

Board of Patent Appeals and Interferences
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

This Appeal Brief is being filed in support of Appellants' appeal of the rejections made in the final Office Action dated June 10, 2011.

(i) Real Party in Interest

The real party in interest is General Motors Company LLC by virtue of a chain of title extending back to an original assignment from the inventors. General Motors LLC is a limited liability company having its principal place of business at 300 Renaissance Center, Detroit, Michigan 48265-3000.

(ii) Related Appeals and Interferences

There are no other appeals and/or interferences known to Appellants, their assignee, and/or legal representatives that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

(iii) Status of Claims

Claims 1-19 have previously been canceled. In the final Office Action of June 10, 2011, claims 24 and 38 were rejected under 35 U.S.C. § 112, second paragraph, whereas claims 20-25, 27, 29-39, and 41 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over prior art. Claims 26, 28, 40, and 42 were objected to as being dependent on a rejected base claim but the Office Action indicates that these claims would be allowable if rewritten in independent form so as to include the limitations of the base claim. The rejections of claims 20-25, 27, 29-39, and 41 are being appealed.

(iv) Status of Amendments

No amendment has been filed subsequent to the final rejection.

(v) Summary of Claimed Subject Matter

In accordance with 37 C.F.R. § 41.37(c)(1)(v), a concise explanation is provided below of subject matter defined in each of the independent claims involved in this appeal, with reference to the specification by page and line numbers and to the drawings by reference characters.

Independent Claim 20 –

Claim 20 is directed to a method (500) of communicating data over a voice channel of a wireless communication system. The method includes the steps of generating a periodic data signal $S_{out}(t)$ modulated with data and periods of silence, wherein the periods of silence comprise gaps in the data during which no modulation occurs (Fig. 5, step 530, Page 13, lines 15-28), and sending the periodic data signal $S_{out}(t)$ as a voice communication through a vocoder and over a voice channel of a wireless communication system (Fig. 5, step 540, Page 14, lines 1-13). Further details concerning the generation of the periodic data signal $S_{out}(t)$ are described at Page 8, lines 7-12 in conjunction with Fig. 2, and an exemplary waveform $S_{out}(t)$ containing the periods of silence is shown in Fig. 4 and discussed at Page 12. The sending of the data signal $S_{out}(t)$ through a vocoder is inherent in the sending of the data signal via a voice channel of the disclosed network transmission standards (CDMA, TDMA, GSM).

Independent Claim 29 –

Claim 29 is directed to a method of communicating data over a voice channel of a wireless communication system. It includes the steps of:

establishing a cellular voice call over a voice channel of a wireless communication system 140 using a selected network transmission standard (Page 11, lines 1-11; Fig. 1 - call is routed from call center to vehicle telematics unit using, for example, CDMA);

generating a periodic data signal $S_{out}(t)$ modulated with (i) data using frequency shift keying and (ii) periods of silence during which no frequency shift keying modulation occurs; (Fig. 5, step 530; Fig. 4; Page 11, lines 27-29; Page 13, lines 12-28); and

sending the periodic data signal $S_{out}(t)$ to a call center 170 over the voice channel of the wireless communication system (Fig. 5, step 540, Page 14, lines 1-13). The periodic data signal is sent over the wireless communication system 140 using a carrier signal that is transmitted

during portions of the periodic data signal that contain the data and during portions of the periodic data signal that contain the periods of silence (Page 14, lines 1-13). The transmission of of $S_{out}(t)$ over a voice channel of any of the disclosed CDMA, TDMA, and GSM network transmission standards inherently involves the use of a carrier signal to transmit the data signal (including both the data and silent portions of the data signal) between the vehicle antenna and cell tower or other antenna of the wireless communication system.

Independent Claim 34 –

Claim 34 is directed to a method (500) of communicating data over a voice channel of a wireless communication system. The method includes the steps of generating a data signal that includes modulated data and periods of silence during which the data signal is unmodulated (Fig. 5, step 530; Fig. 4; Page 11, lines 27-29; Page 13, lines 12-28), and sending the data signal as a voice communication over a voice channel of a wireless communication system (Fig. 5, step 540, Page 14, lines 1-13).

Although the Appellants have provided the summary of claimed subject matter with references to specific embodiments of the invention to comply with the requirements set forth in the relevant provisions of 37 C.F.R., this summary has been provided to aid the Board in evaluating the appeal and is not intended to limit the meaning or definition of any terms in the claims. Furthermore, it should be appreciated that the above-provided reference numerals and pages/line numbers are only for exemplary purposes, as other instances and/or embodiments of the claimed elements could appear elsewhere in the application.

(vi) Grounds of Rejection to be Reviewed on Appeal

The issues on appeal are as follows:

1) whether claims 24 and 38 are indefinite under 35 U.S.C. § 112, second paragraph; and

2) whether claims 20-25, 27, 29-39, and 41 are unpatentable under 35 U.S.C. § 103 (a).

(vii) Argument

1. Claims 24 and 38

The claim language identified by the Examiner in claims 24 and 38 is sufficiently definite with respect to § 112, second paragraph. The Examiner interpreted the claimed limitation "within the range of about 25 milliseconds to about 1000 milliseconds" recited in claims 24 and 38 as being indefinite because the word "about" does not limit the bounds of the claimed invention.[1] However, courts have held that use of the term "about" is permissible without rendering the claim indefinite.[2] For example, the word "about" can be used to avoid "a strict numerical boundary to the specified parameter."[3] In contrast, the Office Action merely asserts that use of the term "about" is *per se* indefinite. Given that courts indeed permit the use of "about" in view of the requirements of § 112, this rejection is traversed. Furthermore, those skilled in the art will be able to readily determine the amount of variation from 25 milliseconds and 1000 milliseconds that would reasonably be covered by the term "about." Thus, Appellants respectfully submit that the language of claims 24 and 38 meets the requirements of § 112, second paragraph.

2. Claims 20-25, 27, 29-39, and 41

Claim 20

Claim 20 recites, *inter alia*, the step of "generating a periodic data signal modulated with data and periods of silence, wherein the periods of silence comprise gaps in the data during which no modulation occurs." Neither Preston nor McDonald teaches or suggests this step, whether the references are viewed individually or in combination.

The Examiner relies on column 6, lines 24-30 of Preston to interpret the sacrificial bits contained in the IBS packet 70 as constituting "periods of silence" as recited in independent claim 20.[4] In prior submissions Appellants have pointed out that Preston's sacrificial bits are 1's and 0's that are converted to tones using frequencies f1 and f2, and that this is different than

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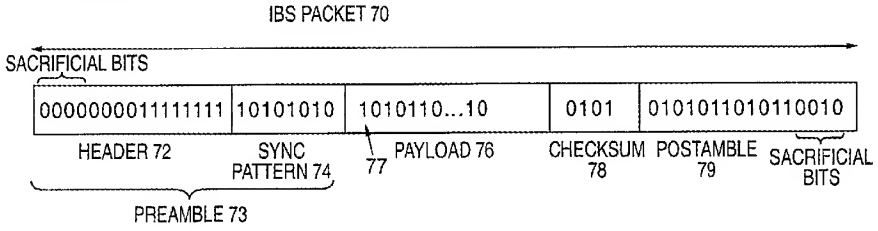
1 Final Office Action, June 10, 2011, page 3, lines 13-15.
2 See, *Ortho-McNeil Pharm., Inc. v. Caraco Pharm. Labs, Ltd.*, 476 F.3d. 1321 (Fed.Cir. 2007).
3 *Id*, at 1326.
4 Final Office Action, June 10, 2011, page 4, lines 7-8.

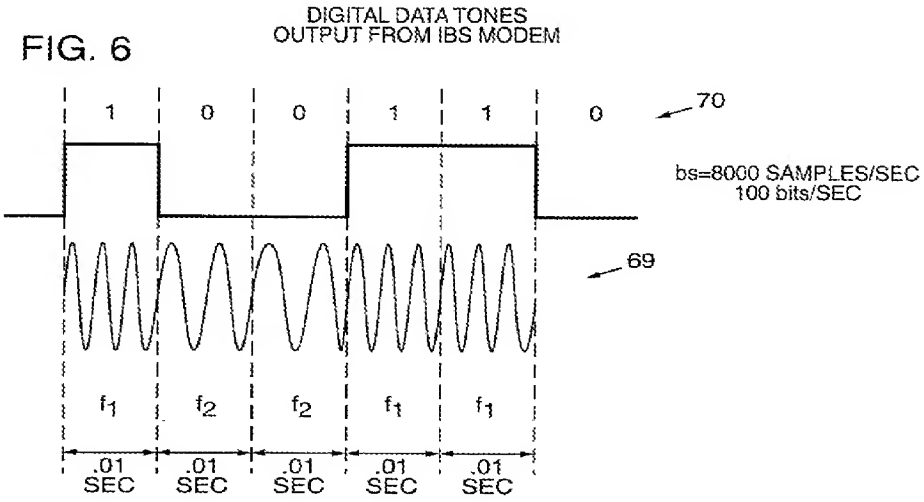
Appellants' recited "periods of silence" that comprise gaps in the data during which no modulation occurs because tones are clearly not "silence." This can be readily appreciated from figures 5 and 6 of Preston, which are reproduced below. In figure 5, the sacrificial bits are shown as part of the preamble 73 and postamble 79 of IBS packet 70.

FIG. 5



The IBS packet 70 is also shown in figure 6 as it is converted to synthesized digital data tones 69. As can be appreciated from the synthesized digital data tones 69 that represent the IBS packet 70 (including the sacrificial bits), no period of silence can be found.

FIG. 6



The data signal represented by the synthesized digital data tones 69 is uninterrupted and thus includes no period of silence. Preston modulates its sacrificial bits as it does with other bits, such as those making up the payload. Thus, Preston does not teach or suggest "gaps … during which no modulation occurs."

The Examiner acknowledges that Preston does not "label or characterize the 'sacrificial bits' contained in the IBS packet 70 as 'period of silence'" and relies on the McDonald reference

to disclose a "silent period."[5] While McDonald labels one of its features as a period of silence, this feature does not teach or even suggest a periodic data signal modulated with periods of silence that comprise gaps in the data during which no modulation occurs. McDonald teaches that a "silence period" is "a period during which no significant information is present in the primary information signal" (emphasis added).[6] Put differently, McDonald admits that information is present but notes that the information's value is of little or no worth. Even though this information may lack worth, one cannot reasonably interpret it as silence of the type that is recited in claim 20. For example, McDonald explains that "if the information signal is a computer data stream, there will...likely be sections containing all zeros, which could be designated as a silence period."[7] According to McDonald, the "silence period" includes data represented by all zeros that is sent via a signal. Fundamentally, the characterization of McDonald differs little from Preston's "sacrificial bits," and therefore does not teach or suggest the "periods of silence" as used in Appellants' claims.

The gaps in the data during which no modulation occurs recited, *inter alia*, in claim 20 are discussed in Appellants' specification and an explicit example is shown in figure 4 between time periods t_1 and t_2, time periods t_3 and t_4, and time periods t_5 and t_6. For convenience, figure 4 is reproduced below.

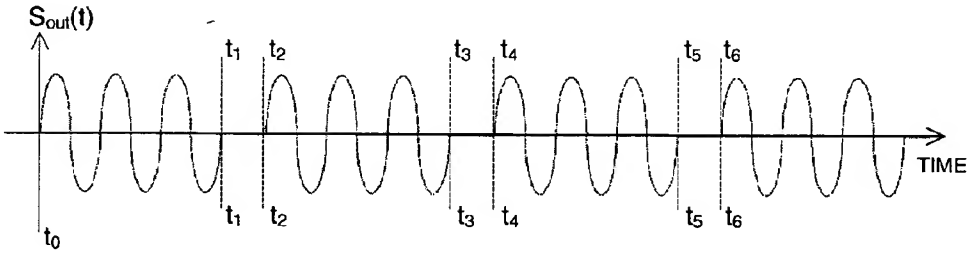


FIG. 4

The portions of the data signal lacking modulation can be easily be understood from the graph shown in figure 4 (e.g., from t_1 to t_2, t_3 to t_4, and t_5 to t_6). In contrast to both Preston and

[5] Final Office Action, June 10, 2011, page 4, line 21-page 5, line 6; McDonald et al., U.S. Patent No. 6,122,271; figure 1, element 28; col. 3, lines 29-68; and col. 4, lines 1-16.

[6] Final Office Action, June 10, 2011, page 5, lines 5-6; McDonald et al., col. 3, lines 45-47.

[7] McDonald et al., col. 3, lines 55-58.

McDonald, the "silence periods" claimed and described by Appellants do not include a data signal.

Appellants disagree with the Examiner's determination of how "periods of silence" from the present application would be understood by those skilled in the art. First and foremost, one must look to how claim terms are used by the Appellants in their claims, specification, and file history - what the Court of Appeals for the Federal Circuit termed "intrinsic" evidence in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). Here, Appellants have consistently used the term to refer to portions of the data signal that do not include any modulation of data or other information - whether it be data that is sacrificial or of value. And that is entirely consistent with the disclosed embodiments of the present application, one of which is shown in figure 4 above. Of lesser importance according to the Federal Circuit is "extrinsic" evidence that goes outside the application and its file history - such as dictionary definitions and use of terminology from other sources. It is this type of less relevant extrinsic evidence that the Examiner relies upon for the expansive interpretation of "periods of silence" that includes the modulated sacrificial bits of Preston or the sections of all zeros of McDonald. Appellants submit that it is improper for the Examiner to ignore the intrinsic evidence in favor of less relevant outside sources to determine what proper meaning should be placed on Appellants' terminology.

Accordingly, Appellants respectfully submit that claim 20 patentably defines over the combination of Preston and McDonald. Claims 21-28 each ultimately depend from claim 20 and should be allowed therewith.

Claim 29

The combination of Preston and McDonald does not teach or suggest the subject matter of claim 29, which contains an express limitation on the data signal characteristics during the periods of silence. Claim 29 recites, *inter alia*, that the data signal is modulated with data using frequency shift keying and "periods of silence during which no frequency shift keying modulation occurs" (emphasis added). Neither Preston nor McDonald teach or suggest this. Preston explicitly teaches modulating the sacrificial bits using frequency shift keying.[8]

[8] Preston et al., U.S. Patent No. 7,206,305, col. 5, lines 44-45; synthesized digital data tones 69 output from the IBS modulator 64.

McDonald was cited for the purpose of interpreting the term "periods of silence" and nothing from McDonald has been identified that would provide one of ordinary skill with any reason to alter Preston's modulation of sacrificial bits to instead generate a data signal as recited in Appellants' claim 29. To the contrary, McDonald teaching using what would otherwise be silence periods to send information, which teaches away from that being recited in claim 29.

Accordingly, Appellants respectfully submit that claim 29 patentably defines over Preston in view of McDonald. Claims 30-39 each ultimately depend from independent claim 29 and should be allowed therewith.

Claim 34

The combination of Preston and McDonald fails to teach or suggest the subject matter of claim 34, which recites, *inter alia*, "generating a data signal that includes modulated data and periods of silence during which the data signal is unmodulated" (emphasis added). As explained above this underlined limitation is not taught by the combination of Preston and McDonald. The Office Action makes no substantive mention of this limitation nor the basis for which it was determined to be disclosed or rendered obvious by the prior art. Furthermore, neither Preston nor McDonald teaches or suggests periods during which a data signal is unmodulated. Thus, the combination of Preston and McDonald cannot reasonably be interpreted as rendering claim 34 obvious.

Accordingly, Appellants respectfully submit that claim 34 patentably defines over Preston in view of McDonald. Claims 35-42 each ultimately depend from independent claim 34 and should be allowed therewith.

Claims 25 and 39

While allowable by virtue of their dependence on allowable base claims, some dependent claims are patentable for reasons other than this dependence and will be argued separately. For example, claims 25 and 39 depend from claims 20 and 29, respectively, but include other limitations that are patentably distinct from the combination of Preston and McDonald. For example, claims 25 and 39 each recite, *inter alia*, the step of "receiving a first periodic data signal and producing a second periodic data signal by modulating the first periodic data signal

with the periods of silence." This is not taught by Preston or McDonald. With respect to the rejection of claims 25 and 39, the Examiner points solely to figure 4 of Preston as disclosing a data source 30, a packet formatter 62, and the synthesized digital data tones 69.[9] However, Preston only teaches that the packet formatter 62 "adds a packet preamble and postamble that helps prevent corruption of the IBS packet payload."[10] Nothing in the preamble/postamble--or any other action carried out by the packet formatter 62--produces a second periodic data signal by modulating the first periodic data signal with the periods of silence.

Accordingly, Appellants respectfully submit that claims 25 and 39 are patentable for reasons other than their dependence on allowable base claims.

Conclusion

In view of the foregoing, Appellants respectfully submits that the rejections of all pending claims in this case are improper. Accordingly, Appellants request Board action to overturn the Examiner's rejections.

The Commissioner is hereby authorized to charge any deficiencies, or credit any overpayment associated with this appeal brief to Deposit Account No. 07-0960.

Respectfully submitted,

REISING ETHINGTON P.C.

/E. Colin Cicotte/

E. Colin Cicotte
Registration No. 63,450
P.O. Box 4390
Troy, Michigan 48099
(248) 689-3500

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JDS/ECC

[9] Final Office Action, June 10, 2011, page 6, lines 4-8.
[10] Preston et al., col. 5, lines 2-4.

(viii) Claims Appendix

1-19. **(Cancelled)**

20. A method of communicating data over a voice channel of a wireless communication system, comprising the steps of:

generating a periodic data signal modulated with data and periods of silence, wherein the periods of silence comprise gaps in the data during which no modulation occurs; and

sending the periodic data signal as a voice communication through a vocoder and over a voice channel of a wireless communication system.

21. The method of claim 20, wherein the wireless communication system is a cellular network.

22. The method of claim 20, wherein the network transmission standard is CDMA, TDMA, or GSM.

23. The method of claim 20, wherein the generating step further comprises generating the periodic data signal with a data sequence using frequency shift keying.

24. The method of claim 20, wherein the duration of each of the periods of silence is within the range of about 25 milliseconds to about 1000 milliseconds.

25. The method of claim 20, wherein the generating step further comprises receiving a first periodic data signal and producing a second periodic data signal by modulating the first periodic data signal with the periods of silence.

26. The method of claim 25, wherein producing the second periodic data signal further comprises the steps of:

receiving a control signal, the control signal supplying parameters for a length of the periods of silence and timing between the periods of silence; and

producing the second periodic data signal by modulating the first periodic data signal based on the received control signal.

27. The method of claim 20, wherein the length of the periods of silence are variable.

28. The method of claim 27, further comprising the steps of:

receiving a response to the periodic data signal over the voice channel of the wireless carrier network; and

varying the length of the periods of silence based on the response.

29. A method of communicating data over a voice channel of a wireless communication system, comprising the steps of:

establishing a cellular voice call over a voice channel of a wireless communication system using a selected network transmission standard;

generating a periodic data signal modulated with (i) data using frequency shift keying and (ii) periods of silence during which no frequency shift keying modulation occurs; and

sending the periodic data signal to a call center over the voice channel of the wireless communication system, whereby the periodic data signal is sent over the wireless communication system using a carrier signal that is transmitted during portions of the periodic data signal that contain the data and during portions of the periodic data signal that contain the periods of silence.

30. The method of claim 29, further comprises the steps of:

(a) generating the periodic data signal using frequency shift keying; and

(b) modulating the periodic data signal with periods of silence that are added at the periodic time intervals.

31. The method of claim 30, wherein step (a) is carried out prior to step (b).

32. The method of claim 29, wherein the network transmission standard is CDMA, TDMA, or GSM.

33. The method of claim 29, wherein the periods of silence comprise frame gaps

34. A method of communicating data over a voice channel of a wireless communication system, comprising the steps of:

generating a data signal that includes modulated data and periods of silence during which the data signal is unmodulated; and

sending the data signal as a voice communication over a voice channel of a wireless communication system.

35. The method of claim 34, wherein the wireless communication system is a cellular network.

36. The method of claim 34, wherein the network transmission standard is CDMA, TDMA, or GSM.

37. The method of claim 34, wherein the generating step further comprises generating the data signal with a data sequence using frequency shift keying.

38. The method of claim 34, wherein the duration of each of the periods of silence is within the range of about 25 milliseconds to about 1000 milliseconds.

39. The method of claim 34, wherein the generating step further comprises receiving a first periodic data signal and producing a second periodic data signal by modulating the first periodic data signal with the periods of silence.

40. The method of claim 39, wherein producing the second periodic data signal further comprises the steps of:

receiving a control signal, the control signal supplying parameters for a length of the periods of silence and timing between the periods of silence; and

producing the second periodic data signal by modulating the first periodic data signal based on the received control signal.

41. The method of claim 34, wherein the length of the periods of silence are variable.

42. The method of claim 41, further comprising the steps of:

receiving a response to the data signal over the voice channel of the wireless carrier network; and

varying the length of the periods of silence based on the response.

(ix) Evidence Appendix

None.

(x) Related Proceedings Appendix

None.